EOS Microwave Limb Sounder   February 28, 2005

A short guide to the use and interpretation of v1.5 Level 1 data.

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Introduction

This document is a brief, and preliminary, guide for those wishing to use EOS MLS Level 1 data (calibrated radiances corresponding to individual limb data integrations). The Instrument Overview and Level 1 Algorithm Theoretical Basis documents are required reading for those wishing to make full use the instrument Level 1 data sets, and are available from the author by request (Robert.F.Jarnot@jpl.nasa.gov). At the time of writing the data set may be considered validated, but with potential minor future refinements to processing algorithms driven by in-flight calibrations and Level 2 data validation results. Feedback on any aspect of these data is encouraged.

Data files

MLS Level 1 data are processed in daily chucks (midnight to midnight UT), and the outputs presented in 15 files, `MLS-Aura_L1type_version_date.suffix`. In these filenames `type` is one of `DIAG`, `ENG`, `LOG`, `OA` or `RAD`, corresponding to diagnostic, calibrated engineering, logfile, orbit/attitude and calibrated radiance data. Additional modifiers appended to `type` for the radiance files include `G`, `D` and `T` corresponding to GHz module filter data, GHz module Digital Autocorrelator data, and THz module data. Metadata are in the files with `.met` suffixes.

Radiance data files

Each GHz calibrated radiance in the radiance files has an estimate of spectrally-varying and spectrally-averaged uncertainty (precision), as well as estimates of spectrally-varying and spectrally-averaged baseline corrections. These baseline corrections are necessary because the 'cold space' reference is not measured through the primary antenna. No noise covariance information is included in these data files, nor is there any estimate of systematic error levels, although we believe that systematic errors are less than 3% in all calibrated radiances. Radiances which have negative precisions estimates should be discarded. Calibrated engineering data is presented in a binary `.dat` file which requires detailed knowledge of the file structure. We do not recommend use of this file by persons outside of the MLS project. All Level 1 data files are fully described in the EOS MLS Level 1 File Description with Data Dictionary, available on request.

Effective use of EOS MLS Level 1 requires detailed knowledge of the instrument and its inner workings, and the Level 1 data should not be used prior to consulting with relevant members of the MLS Science Team in order to obtain the requisite information.

Reading the data files

`.txt` and `.met` are ASCII files requiring no special software for reading. The diagnostic and calibrated radiance files are in HDF-EOS (v5) format, as described in the *HDF-EOS Aura File Format Guidelines.*[1] These files are readable with any HDF-EOS (v5)-capable file reader.

Instrument calibrations are described in the EOS MLS Instrument Calibration Report, available from the author on request.

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[1]`http://www.eos.ucar.edu/hirdls/HDFEOS_Aura_File_Format_Guidelines.pdf`